IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): ~~Method~~ A method for estimating a nitrogen oxide mass stored in a nitrogen oxide catalytic trapping device ~~(1)~~, comprising a catalytic phase, and traversed by the exhaust gases ~~(2)~~ of an internal combustion engine ~~(3)~~ of a motor vehicle ~~(4)~~ comprising an electronic control unit ~~(5)~~, ~~characterized in that~~ wherein:

- the geometry of the catalytic trapping device ~~(1)~~ is split into several (n) perfectly-stirred, successive individual reactors ~~(6, 7)~~; and

- a thermal model allowing calculation of the temperature variation of the catalytic phase of the catalytic trapping device ~~(1)~~ when traversed by the exhaust gases, is combined with an adsorption model allowing calculation at any time of the nitrogen oxide mass stored in the catalytic trapping device ~~(1)~~ as a function of the characteristics of the catalytic trapping device ~~(1)~~, the temperatures from the thermal model for each individual reactor, and the mass flow of exhaust gas from the engine ~~(3)~~.

Claim 2 (Currently Amended): ~~Method~~ The method according to claim 1, ~~characterized in that~~ wherein a correction is carried out of the storage capacity of the nitrogen oxide catalytic trapping device ~~(1)~~ of each individual reactor i of order i (i - 1 to n) being a predetermined function of the temperature of the catalytic phase of the individual reactor i, said storage capacity being a function of corrective parameters comprising the hourly volume velocity of the individual reactor i, the ageing of the catalytic trapping device ~~(1)~~, and its sulphur poisoning.

Claim 3 (Currently Amended): ~~Method~~ The method according to claim 2, ~~characterized in that~~ wherein the mass of nitrogen oxide instantaneously adsorbed (dNS_i/dt)

by the catalytic trapping device ~~(1)~~ of each individual reactor i (i = 1 to n) is calculated using the following relationship:

$$\frac{dNS\_i}{dt} = NOx\_i * Eff\_i$$

in which:

NOx_i : mass flow of nitrogen oxides at the inlet of the individual reactor i, in g/s, NOx_1 calculated;

Eff_i : instantaneous storage efficiency in the individual reactor i, a predetermined function of NS_i/NSC_i and of T_i, obtained by looping the calculation of NS_i/NSC_i;

NS_i : nitrogen oxide mass present in the reactor i, in g;

NSC_i : maximum nitrogen oxide mass being able to be stored by the reactor i, in g;

T_i : temperature of the catalytic phase at the inlet of the individual reactor i, calculated by the thermal model, in K.

Claim 4 (Currently Amended): ~~Method~~ The method according to the claim 3, ~~characterized in that~~ wherein the nitrogen oxide mass (NS_i) present in the individual reactor i is calculated using the following relationship:

$$NS\_i = \int_{t_0}^{t} \left(\frac{dNS\_i}{dt} \right) dt + NS\_i(t_0)$$

in which:

interval t_0 to t : interval of time between the end (t_0) of the last of regeneration phase of the catalytic trapping device ~~(1)~~ and the present time (t), in s; and

NS_i : nitrogen oxide mass present in the reactor i, in g.

$NS\_i\ (t_0)$: estimated nitrogen oxide mass present in the reactor i at time t0 corresponding to the end of the last regeneration phase of the catalytic device ~~(1)~~, in g.

Claim 5 (Currently Amended): ~~Method~~ The method according to claim 4, ~~characterized in that~~ wherein the total mass (NS) of nitrogen oxides stored in the entire catalytic trapping device ~~(1)~~ is calculated using the following relationship:

$$NS = \sum_{i=n}^{n} NS\_I$$

in which:

NS : total mass of nitrogen oxides stored in the entire catalytic trapping device ~~(1)~~, in g; and

NS_i : nitrogen oxide mass present in the individual reactor i, in g.

Claim 6 (Currently Amended): ~~Method~~ The method according to claim 5, ~~characterized in that~~ wherein the flow of untreated nitrogen oxides leaving the last reactor n is calculated using the following relationship:

$$NOx\_exhaust\ outlet = NOx\_n * (1-Eff\_n)$$

in which:

NOx_exhaust outlet : mass flow of untreated nitrogen oxides, at the exhaust outlet after traversing the catalytic trapping device ~~(1)~~, in g/s;

NOx_n : mass flow of nitrogen oxides at the inlet of the last reactor n, in g/s; and

Eff_n : instantaneous storage efficiency in the last reactor n.

Claim 7 (Currently Amended): ~~Method~~ The method according to claim 1, ~~characterized in that~~ wherein the geometry of the catalytic trapping device ~~(1)~~ is split into ~~a number of~~ between 1 and 6 perfectly-stirred successive individual reactors ~~comprised between 1 and 6~~.

Claim 8 (Currently Amended): ~~Device~~ A device for estimating a nitrogen oxide mass stored in a nitrogen oxide catalytic trapping device ~~(1)~~, comprising a catalytic phase, and traversed by the exhaust gases ~~(2)~~ of an internal combustion engine ~~(3)~~ of a motor vehicle ~~(4)~~, comprising an electronic control unit ~~(5)~~, ~~characterized in that it comprises~~ wherein the device comprises:

- means for splitting the geometry of the catalytic trapping device into several (n) perfectly-stirred, successive individual reactors; and
- means for estimating the nitrogen oxide mass present in the catalytic trapping device ~~(1)~~ by combining a thermal model allowing calculation of the temperature variation of the catalytic phase of the catalytic trapping device ~~(1)~~ when it is traversed by the exhaust gases, and an adsorption model allowing calculation at any time of the nitrogen oxide mass stored in the catalytic trapping device ~~(1)~~ as a function of the characteristics of the catalytic trapping device ~~(1)~~, the temperatures from the thermal model for each individual reactor, and the mass flow of exhaust gas from the engine ~~(3)~~.

Claim 9 (Currently Amended): ~~Device~~ The device according to claim 8, ~~characterized in that it~~ wherein the device comprises means for carrying out a correction of the storage capacity of the nitrogen oxide catalytic trapping device ~~(1)~~ of each individual reactor i of order i, said correction being a predetermined function of the inlet temperature of

the individual reactor i, and said storage capacity being a function of corrective parameters comprising the hourly volume velocity of the individual reactor i, the ageing of the catalytic trapping device ~~(1)~~, and its sulphur poisoning.

Claim 10 (Currently Amended): ~~Method~~ A method for the periodic regeneration of a nitrogen oxide catalytic trapping device ~~(1)~~ traversed by the exhaust gases ~~(2)~~ of an internal combustion engine ~~(3)~~ of a motor vehicle ~~(4)~~ comprising an electronic control unit ~~(5)~~, ~~characterized in that~~ wherein the nitrogen oxide mass trapped in the catalytic trapping device ~~(1)~~ is estimated ~~using~~ by the method according to claim 6 ~~claims 6 or 7, or with a device according to claims 8 or 9~~.

Claim 11 (New): A method for the periodic regeneration of a nitrogen oxide catalytic trapping device traversed by the exhaust gases of an internal combustion engine of a motor vehicle comprising an electronic control unit, wherein the nitrogen oxide mass trapped in the catalytic trapping device is estimated with the device according to Claim 8.